PANEL DISCUSSION: SSL RELIABILITY AND LIFETIME

7/18/2012

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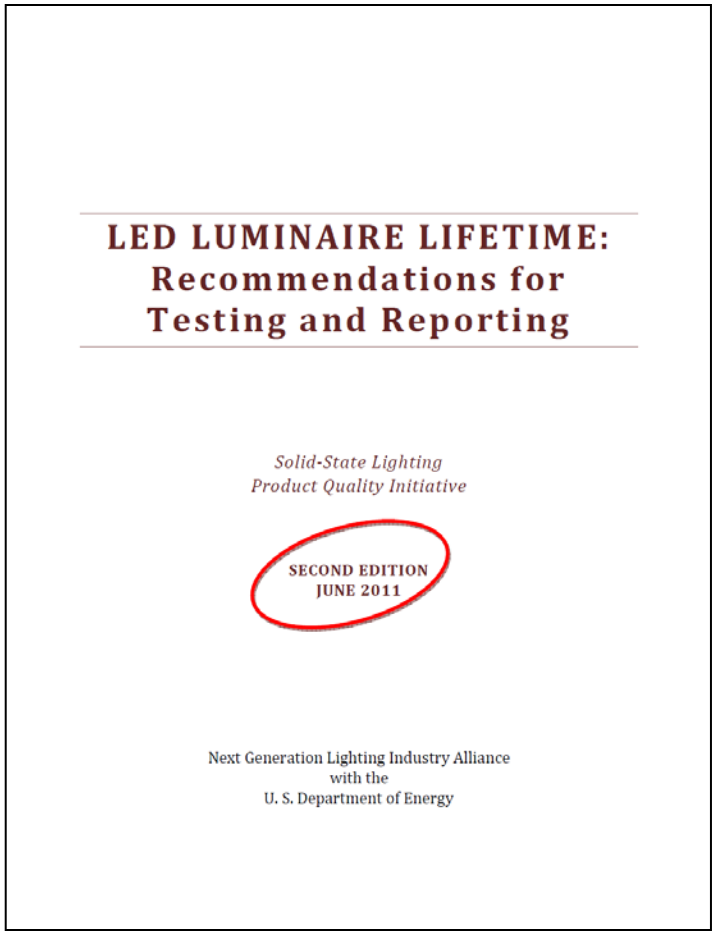
Why Talk About "Rated Life" for SSL

- The customer wants to know what he's buying
  - How to justify paying more for a bulb?
- The seller wants to advertise that value
  - Long life adds to it
- Wild claims endure, endangering the reputation of LED technology
  - It's happened before!
- *A good answer does not really exist today*

What is LED Luminaire "Life"?

- The median time for the lumen output to fall below 70% of the average initial light output *for any reason*
  - Only light output,
    - Not color, e.g. (sometimes an issue)
  - Not just lumen depreciation
  - Very hard to measure



A Few "Facts of Life"

- *Lumen depreciation is not a proxy for luminaire (or lamp) lifetime*
  - LM-80 data with TM-21 can predict source lumen depreciation, but NOT THE LIFE of the luminaire
- There are many failure mechanisms possible
  - The "weak link" depends on the design of the specific product; there may be several of them
- The proposed LM-84 method is of limited help
  - It's still just lumen depreciation

So What Do We Do?

- An accurate answer: Measure a statistically significant sample of product for a long time using LM-79
  - *Way too expensive and lengthy to be practical*
- Other Options for Now
  - Don't claim a lifetime; state a warranty
  - State the predicted L_{70} but *don't call it "life"*
  - State the predicted depreciation for a given time

A System Reliability Approach

- Study luminaire products to determine potential failure mechanisms using accelerated stresses
- Measure the components and materials in those products to characterize their reliability
- Develop a statistical model to predict luminaire lifetime by "constructing" the product from its pieces
- Verify the model through long-term ageing experiments on full products

We're Still Working On It….

- Lighting Facts interim solutions
- Proprietary approaches
- Consortium of industry and university players
  - To develop the systems approach
  - Share information and experimental results
  - Program provides facilitation support and interaction with a funded project

This Panel

- Some thoughts as to what we can do now, and where we should go
  - Jim Gaines, Philips Lighting
  - Jason West, D&R International
  - Lynn Davis, Research Triangle Institute (RTI)